

PORT ALEXANDER – CEDAR STREET BOARDWALK
RECONNAISSANCE REPORT
PORT ALEXANDER, ALASKA

July 2007



Prepared for:
Department of Transportation and Public Facilities
Southeast Region
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1 PURPOSE AND NEED

The Denali Commission has appropriated a small amount of money for Port Alexander to improve their boardwalk system. The Community requests to use this money to extend the boardwalk system along Cedar Street. The purpose of this report is to investigate the project area, identify design issues, develop project costs, and recommend an appropriate plan of action.

Port Alexander is a remote community with a population of approximately 90, located on the southeastern tip of Baranof Island about 85 miles south of Sitka. The port provides a safe harbor during the storms that frequent Chatham Strait. During the early 1800s Port Alexander was a bustling frontier town of several thousand people. The U.S. Department of Interior platted the townsite in 1934 and the inner harbor in 1983. The community encompasses both sides of the 600-foot wide harbor with residents using small skiffs, kayaks, and rowboats to move from one side of the community to the other. Port Alexander is in the maritime climate zone, marked by cool summers and mild winters. The average total precipitation is 167 inches per year, which includes 63 inches of snow. Commercial fishing and subsistence uses of marine and forest resources constitute the main economic base. Sport fishing charters currently are a small but growing part of the economy.

Port Alexander is situated in southeast Alaska's rainforest where hillsides are covered in tall spruce and hemlock trees and flat areas are covered in muskeg. Access to properties is difficult due to the steep terrain, thick forest growth, and soft non-supportive ground cover, (muskeg). Over the years, boardwalks have been constructed to the rear of many beachfront properties. These existing boardwalks provide reasonable walking access to the first two rows of properties up from the beach.



Figure 1 – Port Alexander Outer Harbor

Properties located three and four rows up from the beach have no public boardwalks for access and many residents are using the path-of-least resistance, which means they are trespassing on private property.

The Cedar Street right-of-way is located between the third and fourth row of properties up the hillside from the beach, but has few pedestrian improvements. An existing 8-foot-wide boardwalk in the Waterline Easement provides access to the Cedar Street right-of-way. Boardwalks on Front Street and First Avenue provide connecting access to the beach. Cedar Street residents need a boardwalk to provide reasonable access to their property and to eliminate the current informal paths that trespass on private property. Boardwalks are needed to avoid tearing up the muskeg and to cross the mud and muck that impedes reasonable access.

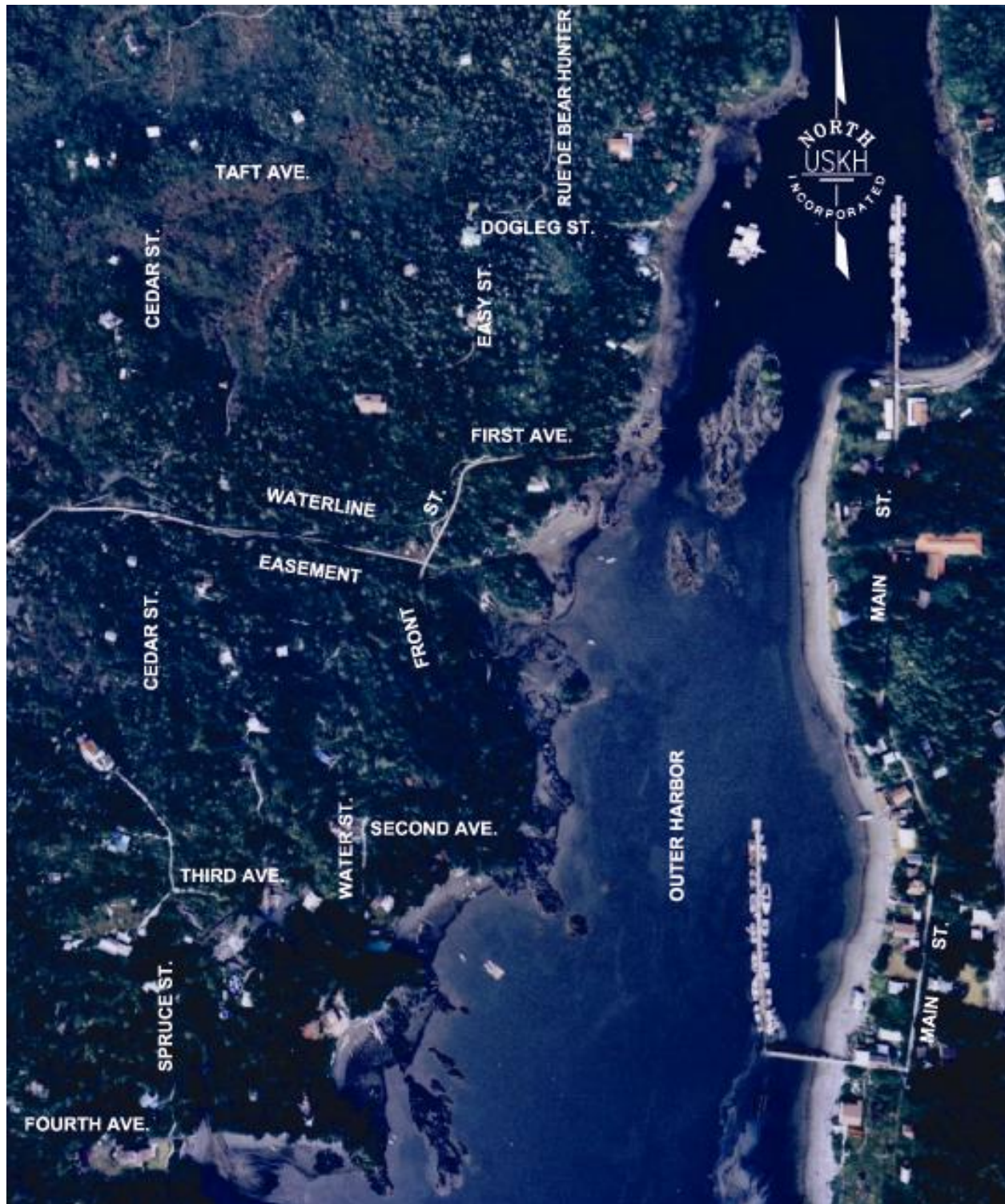


Figure 2 – Aerial Photo of Port Alexander

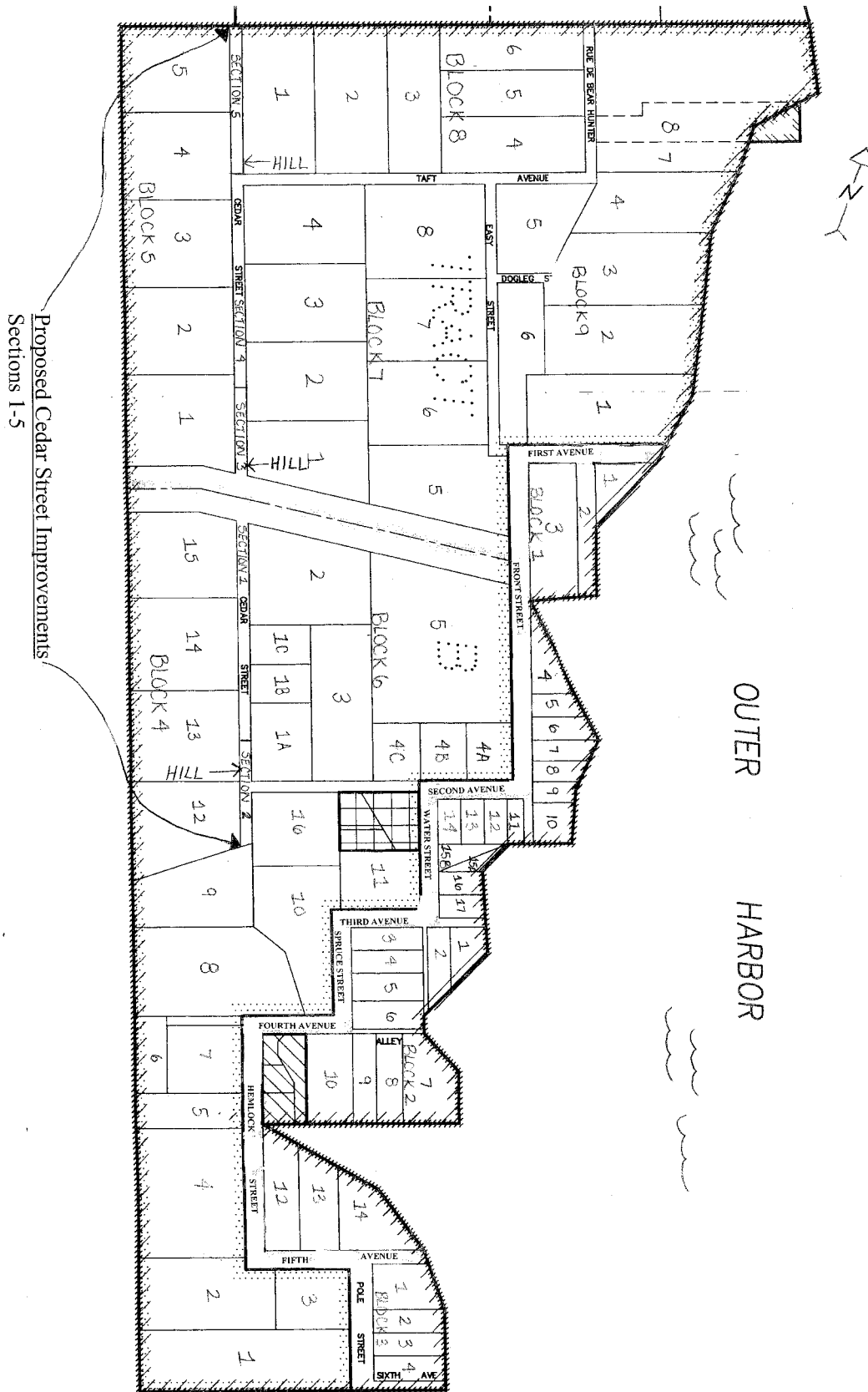


Figure 3 – Port Alexander Planning Map

2 PROJECT DESCRIPTION

2.1 Project Limits

The Waterline boardwalk separates Cedar Street into a northern section and a southern section. The southern section extends from the Waterline boardwalk, 750 feet south to Tract 4 Lot 9. The northern section extends from the Waterline boardwalk, 1,000 feet north to Tract 5 Lot 5.

2.2 Existing Conditions

Boardwalks are in dedicated right-of-ways owned and maintained by the City of Port Alexander. Residents use the boardwalks to access their property, the school, and other community buildings and to transport supplies by hand or in a wheelbarrow. Some residents use power wheelbarrows, capable of hauling from 500 to 800 pounds, to haul supplies to and from their properties. The City prohibits vehicles and private all-terrain vehicles (ATVs) from driving on the boardwalks.

Two residents near the Waterline boardwalk have laid some narrow planks in the right-of-way for access to their property. The rest of Cedar Street is little more than a game trail through thick brush with few pedestrian improvements.



Figure 4 – Residents have built their own access paths

2.3 Snow Removal

The City uses a 4x4 ATV for boardwalk snow plowing. They are in the process of purchasing a walk-behind track snow blower to remove snow on the narrow and steep sections of the Waterline boardwalk and increase safety of City workers.



Figure 5 – ATV in Maintenance Shed

2.4 Typical Construction

New construction will match the existing boardwalks in Port Alexander and many other small southeast communities. Boardwalks will be constructed of pressure treated timber, galvanized fasteners, with some type of slip-resistant surfacing. There are many different slip-resistant surfacing materials available on the market, however, most communities use asphalt shingle roofing or a wire mesh product due to cost constraints. Port Alexander uses a wire mesh (hardware fabric) and gets 1-4 years of service, depending on traffic.



Figure 6 – Hardware Fabric – Slip-Resistant Surfacing

The boardwalk will be 6 feet wide with handrails on sides that are greater than 30 inches above ground. Foundations will be cast-in-place concrete and backfilled with gravel. Designers may also consider alternative foundation types such as pre-cast concrete, direct-bury treated wood, as well as post and pad. Existing Port Alexander boardwalks have used both direct-bury treated wood and post and pad foundation types.



Figure 7 – Waterline Boardwalk – Typical Construction

2.5 Alignment

The boardwalk will typically be constructed in the center of the 25-foot right-of-way. The first section of north Cedar Street climbs a steep hill. Figure 8 shows this section of Cedar Street, the stairs on the left of the figure are just to the left of the Cedar Street right-of-way. The City would like designers to consider obtaining additional right-of-way along this section to route the boardwalk around the side of this hill to avoid stairs on the boardwalk. Residents use wheel barrows to transport goods to their homes, making boardwalks with stairs undesirable.



Figure 8 – Steep Hill on North Cedar Street

2.6 Utilities

A 4-inch arctic insulated water line provides water service the full length of Cedar Street. This waterline is shallowly buried for about half the length of Cedar Street and the remainder is laid on the ground surface. An underground communication cable provides phone service to the southern half of Cedar Street and only the first lot on northern half of Cedar Street. Port Alexander has no public electrical service, so residents use personal generators when they want electricity. No additional utilities are proposed with this project.



Figure 9 – Arctic Insulated Waterline Laid on Ground Surface

2.7 Geotechnical

No geotechnical investigation has been performed for this project. One local resident, who helped construct the waterline boardwalk, reported the soils in the area typically consist of a layer of surface organics, overlaying weathered rock. This type of soil structure is common in many southeast communities. The organic layer may be several feet thick, particularly along the flat areas on north Cedar Street.

2.8 Survey

There is no topographical survey available for the project area. Designers will need a topographical survey in order to produce design documents that can be competitively bid. Topographical survey should include the full 25-foot width of the Cedar Street right-of-way, the intersection area with the waterline boardwalk, and ties to survey control monuments.

2.9 Right-Of-Way

Cedar Street is a 25-foot-wide right-of-way. The City had Stragier Engineering Services, Inc. produce a townsite planning map in 1999. This planning map (Figure 3) shows the extent of the Cedar Street right-of-way.

2.10 Survey Markers

Our site reconnaissance visit did not specifically try to locate survey markers. However we did find several survey markers.



Figure 10 – North Cedar – U.S.S 2010 Marker



Figure 11 – North Cedar - Blk 5 Lot 5



Figure 12 – North Cedar – U.S.S. 2415 Cnr 2



Figure 13 – South Cedar - Block 4 Lot 15

2.11 Environmental Impacts

The Cedar Street boardwalk will cross a small stream about 100 feet north of the Waterline boardwalk. The stream is moving slowly in this area and is about 3 feet wide and 1-foot deep. More than half of Cedar Street is on a sloping hillside in a cedar/hemlock forest. About half of the north section of Cedar Street is in a flat area with open palustrine emergent wetlands.

2.12 Maintenance

Wooden boardwalks require some annual maintenance to prolong their life and to keep them safe for pedestrian use.

The City of Port Alexander has a small maintenance budget and has done a good job of cleaning and maintaining the existing boardwalks. They plow snow off the boardwalks in the winter, power wash the existing boardwalks each summer, replace wire mesh surfacing every 1-4 years, and repair or replace broken or rotten boards as needed. The Denali Commission can be reassured that the improvements will be used and well maintained.

3 COST ESTIMATES

The Cedar Street boardwalk was broken into five sections for estimating construction costs: See Figure 3, planning map, for extents of each section.

- Section 1 starts at the Waterline boardwalk and goes 500 feet south to the top a hill.
- Section 2 continues 220 feet south descending the small hill and ending at Block 4, Lot 9.
- Section 3 starts at the Waterline boardwalk and extends 250 feet north up to the summit of the hill on block 5, Lot 2.
- Section 4 continues 450 feet north across a flat area to intersect with the Taft Avenue right-of-way.
- Section 5 continues 270 feet north coming down a hill from Taft Avenue and ending at Block 5, Lot 5.

Residents of Port Alexander would prefer Sections 1 and 2 be constructed first because this would provide access for most of the residents that have to currently trespass on private property to reach their properties.

Total costs for all five sections is \$1.1 million. This includes design, surveying, construction, project management, and construction administration. Detailed cost estimates are included in Appendix A

4 RECOMMENDATIONS

Current Denali grant funding is not enough to construct all of the Cedar Street boardwalk. It is only enough to construct about half of Section 1, which would provide access to 3-4 lots. The Department foresees two ways to approach this project.

- 1) Design the full length of the Cedar Street boardwalk using the current grant funding, and then obtaining additional funding for construction. Many project costs are fixed and will be required no matter how large the project; such as mobilization, surveying, contract management, specifications and many design details. The cost of these items can be spread across the full length of Cedar Street, thus making the design and construction efforts more efficient.
- 2) Design and construct a portion of Section 1 that fits within the current grant funding and then leave the remaining boardwalk sections for future grants. A few Port Alexander residents would see immediate benefits from the current Denali Grant, without waiting for additional funding. Additional funding to construct the full length of Cedar Street may be years in the future.

Appendix A

Cost Estimate

**Port Alexander
Cedar Street - Boardwalk
ENGINEERS ESTIMATE**

SUMMARY

		Construction Cost	Total Project Cost
Section 1		\$177,000	\$301,000
Section 2		\$87,000	\$148,000
Section 3		\$99,000	\$168,000
Section 4		\$165,000	\$280,000
Section 5		\$111,000	\$188,000
Sub Totals		\$639,000	\$1,085,000
Design	15%	\$95,850	
Construction Engineering	20%	\$127,800	
ICAP	4.88%	\$42,097	
Contingency	20%	\$180,949	
Project Total		\$1,090,000	

Port Alexander
Cedar Street - Boardwalk
ENGINEERS ESTIMATE

Section 1

ITEM	UNIT	QUANTITY	LABOR		UNIT / COST		SUBTOTAL
			CREW	C - HRS/UNIT	LABOR	MAT.	
Section 1							
SITE PREP & CLEARING	EA.	1	L3	25	4500		\$4,500
PACK MATERIALS TO SITE	EA.	1	L3	121	21780		\$21,780
FOUNDATIONS	EA.	85	L3	1	180	75	\$21,675
4X6X20 POSTS	EA.	4.88%	L3	1	180	65	\$12
2X6X20 CROSS BRACING	EA.	0.049	L1	0.5	30	35	\$3
4X12X20 STRINGER	EA.	56	L3	0.75	135	100	\$13,160
3X12X20 DECKING	EA.	167	L2	0.5	60	80	\$23,380
4X4X20 RAILING	EA.	42	L1	2	120	20	\$5,880
2X4X20 RAILING	EA.	389	L1	0.5	30	14	\$17,116
CONNECTIONS	LS	1	L1	0	0	833	\$833
ASPHALT ROOFING ROLL	EA.	17	L2	1	120	35	\$2,635
	L.F		L1		0		\$0
SUB TOTALS					\$77,920	\$33,054	\$110,974
CONTRACTOR OVERHEAD (% of total)							\$66,033
ITEM TOTAL							\$177,007

Port Alexander
Cedar Street - Boardwalk
ENGINEERS ESTIMATE

Section 2

ITEM	UNIT	QUANTITY	LABOR		UNIT / COST		SUBTOTAL
			CREW	C - HRS/UNIT	LABOR	MAT.	
Section 2							
SITE PREP & CLEARING	EA.	1	L3	11	1980		\$1,980
PACK MATERIALS TO SITE	EA.	1	L3	68	12240		\$12,240
FOUNDATIONS	EA.	39	L3	1	180	75	\$9,945
4X6X20 POSTS	EA.	4.88%	L3	1	180	65	\$12
2X6X20 CROSS BRACING	EA.	0.049	L1	0.5	30	35	\$3
4X12X20 STRINGER	EA.	24	L3	1.5	270	100	\$8,880
3X12X20 DECKING	EA.	73	L2	0.5	60	80	\$10,220
4X4X20 RAILING	EA.	18	L1	2	120	20	\$2,520
2X4X20 RAILING	EA.	171	L1	0.5	30	14	\$7,524
CONNECTIONS	LS	1	L1	0	0	367	\$367
ASPHALT ROOFING ROLL	EA.	7	L2	1	120	35	\$1,085
	L.F		L1		0		\$0
SUB TOTALS					\$40,240	\$14,536	\$54,776
CONTRACTOR OVERHEAD (% of total)							\$32,594
ITEM TOTAL							\$87,370

Port Alexander
Cedar Street - Boardwalk
ENGINEERS ESTIMATE

Section 3

ITEM	UNIT	QUANTITY	LABOR		UNIT / COST		SUBTOTAL
			CREW	C - HRS/UNIT	LABOR	MAT.	
Section 3							
SITE PREP & CLEARING	EA.	1	L3	25	4500		\$4,500
PACK MATERIALS TO SITE	EA.	1	L3	61	10980		\$10,980
FOUNDATIONS	EA.	44	L3	1	180	75	\$11,220
4X6X20 POSTS	EA.	4.88%	L3	1	180	65	\$12
2X6X20 CROSS BRACING	EA.	0.049	L1	0.5	30	35	\$3
4X12X20 STRINGER	EA.	28	L3	1.5	270	100	\$10,360
3X12X20 DECKING	EA.	83	L2	0.5	60	80	\$11,620
4X4X20 RAILING	EA.	21	L1	2	120	20	\$2,940
2X4X20 RAILING	EA.	194	L1	0.5	30	14	\$8,536
CONNECTIONS	LS	1	L1	0	0	416.667	\$417
ASPHALT ROOFING ROLL	EA.	8	L2	1	120	35	\$1,240
	L.F		L1		0		\$0
SUB TOTALS					\$45,250	\$16,578	\$61,828
CONTRACTOR OVERHEAD (% of total)							\$36,790
ITEM TOTAL							\$98,617

Port Alexander
Cedar Street - Boardwalk
ENGINEERS ESTIMATE

Section 4

ITEM	UNIT	QUANTITY	LABOR		UNIT / COST		SUBTOTAL
			CREW	C - HRS/UNIT	LABOR	MAT.	
Section 4							
SITE PREP & CLEARING	EA.	1	L3	23	4140		\$4,140
PACK MATERIALS TO SITE	EA.	1	L3	127	22860		\$22,860
FOUNDATIONS	EA.	77	L3	1	180	75	\$19,635
4X6X20 POSTS	EA.	4.88%	L3	1	180	65	\$12
2X6X20 CROSS BRACING	EA.	0.049	L1	0.5	30	35	\$3
4X12X20 STRINGER	EA.	50	L3	0.75	135	100	\$11,750
3X12X20 DECKING	EA.	150	L2	0.5	60	80	\$21,000
4X4X20 RAILING	EA.	38	L1	2	120	20	\$5,320
2X4X20 RAILING	EA.	350	L1	0.5	30	14	\$15,400
CONNECTIONS	LS	1	L1	0	0	750	\$750
ASPHALT ROOFING ROLL	EA.	15	L2	1	120	35	\$2,325
	L.F		L1		0		\$0
SUB TOTALS					\$73,480	\$29,715	\$103,195
CONTRACTOR OVERHEAD (% of total)							\$61,405
ITEM TOTAL							\$164,600

**Port Alexander
Cedar Street - Boardwalk
ENGINEERS ESTIMATE**

Section 5

ITEM	UNIT	QUANTITY	LABOR		UNIT / COST		SUBTOTAL
			CREW	C - HRS/UNIT	LABOR	MAT.	
Section 5							
SITE PREP & CLEARING	EA.	1	L3	14	2520		\$2,520
PACK MATERIALS TO SITE	EA.	1	L3	94	16920		\$16,920
FOUNDATIONS	EA.	47	L3	1	180	75	\$11,985
4X6X20 POSTS	EA.	4.88%	L3	1	180	65	\$12
2X6X20 CROSS BRACING	EA.	0.049	L1	0.5	30	35	\$3
4X12X20 STRINGER	EA.	30	L3	1.5	270	100	\$11,100
3X12X20 DECKING	EA.	90	L2	0.5	60	80	\$12,600
4X4X20 RAILING	EA.	23	L1	2	120	20	\$3,220
2X4X20 RAILING	EA.	210	L1	0.5	30	14	\$9,240
CONNECTIONS	LS	1	L1	0	0	450	\$450
ASPHALT ROOFING ROLL	EA.	9	L2	1	120	35	\$1,395
	L.F		L1		0		\$0
SUB TOTALS					\$51,550	\$17,895	\$69,445
CONTRACTOR OVERHEAD (% of total)							\$41,322
ITEM TOTAL							\$110,767

Port Alexander
Cedar Street - Boardwalk
ENGINEERS ESTIMATE

CONTRACTOR OVERHEAD

CONTRACTOR OVERHEAD	UNIT	QUANTITY	UNIT / COST	SUB TOTAL	Notes:
OFFICE SUPPORT	PERCENT	\$400,218	15%	\$60,033	1 Trip per Crew per 10 days \$8,000/ trip 80,000lbs 1 Per every 4 days 0
AIR TRANSPORTATION	E.A	19	\$190	\$3,610	
FREIGHT / BARGE	E.A	6	\$8,000	\$48,000	
FREIGHT / AIR	E.A	47	\$50	\$2,350	
MEALS & LODGING	MAN/DAY	561	\$150	\$84,129	
PROFIT	PERCENT	\$400,218	10%	\$40,022	
TOTAL				\$238,143	59.5%